

The U. S. is intending to dispose of once-used nuclear fuel containing plutonium at Yucca Mountain in Nevada. The government has not yet certified that facility as safe for this disposal. One reason that other countries recover the plutonium from nuclear fuel is to lessen the amount of material that needs such extraordinarily long safe storage. With the plutonium and other fuel materials removed, the resulting nuclear waste loses its radioactivity in about 500 years. The ability to build storage facilities that have lasted that long dates back to the Egyptians. Witness their pyramids.

In **summary**, since its discovery, plutonium has been intensively studied. Its qualities are better understood than many common industrial materials. It must be handled carefully, like any other useful but potentially harmful material. It has been generally used safely. The processes for handling it have continued to become more conservative. Members of Coalition 21 believe that the plutonium risks to the general public in Idaho are minimal. In our opinion, these risks can continue to be adequately managed.

**For those wanting numbers:** Inhalation risk: Swallowing an estimated 500 milligrams of plutonium will cause acute fatal damage to the GI tract. That amount is 50% more than an adult aspirin weighing 325 milligrams. Inhaling 20 milligrams of plutonium dust of optimal particle size will cause death in about a month due to lung damage.

Inhaling one-tenth of a milligram of plutonium will eventually cause fatal lung cancer. The largest particle of plutonium that can be readily inhaled is about 3 micrometers in diameter. (The diameter of the human hair is up to 20 times greater.) It would require 700,000 of these particles to make 0.1 milligrams. Reducing the diameter of the average particle to 0.2 micrometer decreases its volume by 3500. This reduction in size increases the potentially fatal number of particles (in 0.1 milligrams) to over 2 billion.

**Plutonium in water:** Measurements of plutonium traces in natural waters have been made in many places around the world. Water in contact with sediments (soils) dissolves only about one part in 10,000 to 100,000 of the plutonium in the adjacent sediment.

**Plutonium forms and radioactivity:** Pu-239 is the main form of plutonium, both in weapons and in a less pure state in reactor fuel. This plutonium isotope has a half-life of 23,400 years. (Half-life means the time to lose half of its remaining radioactivity). At most, ten half-lives are needed for essentially all radioactivity to disappear. Reactor fuel contains other plutonium isotopes with much shorter half-lives. The shorter half-life make them and the reactor fuel much more radioactive than weapons-grade plutonium.

**References:** Furnished on request.

**Coalition 21** is an all-volunteer group supporting the beneficial uses of nuclear technology. You may write us with your comments on this summary at P. O. Box 51232, Idaho Falls, Idaho 83404. The email address is [facts@coalition21.com](mailto:facts@coalition21.com).

George Freund prepared this summary. Reviewers included Coalition 21 members Jack Barraclough, John Commander, Steve Herring, Marty Huebner, and Dick Kenney.